If You Can Simulate It, You Can Fit It

Do-It-Yourself Phylogenetic Models of Trait Evolution for the Fossil Record with the R Package TreEvo

David Bapst, Brian O’Meara & Barb Banbury

The Problem

![Graph showing pollinator regimes with different optima, unidirectional bounds.]

Parameter Estimates? Model Likelihood = ???

The Solution: Approximate Bayesian Computation (ABC)

1. Draw New Parameter Values
2. Simulate Trait Change On Input Tree
3. Compare For Acceptance to Posterior

Modeling Trait Evolution with TreEvo

\[ X_t \sim X_{t-1} + \text{Intrinsic } \Delta + \text{Extrinsic } \Delta \]

Example

Arbitrary Optima

Character Displacement

Limits of ABC

- Slow
- Identifiability

Trait evolution models should match our biological understanding, not methodological limits. What new models can you imagine?

For the package, see: https://github.com/bomeara/treeco